

---

**Appendix AA**  
**Summaries of Water Provider's**  
**Water Conservation Programs**

---

# Summaries of Water Provider's Water Conservation Programs

## City of Aurora

Aurora Water currently has an extensive water conservation program. Aurora Water's water conservation program is a multi-faceted approach including programs in the following areas:

Conservation Education/Outreach, Xeriscape Education and Demonstration Gardens, Demand Management/Water Budgets/Conservation Pricing, Program Evaluation/Research, Legal Remedies/Ordinances, Financial Rebates/Incentives and Peer Agency Collaboration/Outreach.

### Key Accomplishments in 2008

Rebated our customers to convert almost 350,000 square feet of high water use landscape into water wise, Colorado appropriate, landscaping saving Aurora approximately 3,043,551 gallons/ 9.34 acre feet annually. Rebated 1192 toilets that replaced older inefficient models saving over 35 acre feet annually. Rebated 1816 high efficiency washing machines saving over 63 acre feet annually.

### Staffing

In 2008, the Aurora Water conservation division employed 11 full-time employees (FTE), 3 contract employees, 1 temporary seasonal water monitor and 3 temporary seasonal interns.

### Adult Education

Since 2003, Water Conservation staff has facilitated free classes for Aurora Water customers. 2008 was the beginning of a new effort to collaborate with other city departments and local organizations to bring a holistic view of water use.

### Winter Conservation Classes

From February through April, Water Conservation held 8 indoor classes on a range of subjects.

### Summer Xeriscape Classes

The bulk of classes and attendance occurs at the summer classes held at the Xeriscape demonstration gardens. Two types of classes are taught; rebate-centric and specific landscape topics.

### Youth Education

In 2008, Aurora Water hosted the 15th annual Aurora Youth Water Festival at the Community College of Aurora where 1,400 fifth grade students attended and participated in numerous presentations and exhibits on water.

### Classroom presentations and other events

In 2008, Water Conservation Youth Program carried out 76 school presentations educating 3027 students and providing 50 contact hours for teachers. Also, the Youth Program carried out 5 school assemblies educating 1347 students. Additionally, the youth education program assisted with a Girl Scout Badge day and AQWUA teen camp at the Aurora Reservoir educating 67 students.

### Forests to Faucets Teacher Training

Aurora Water's Conservation and Clean Water Program staff teamed up to create the Forests to Faucets teacher training. This is a Project WET-based teacher training where 25 teachers were trained in various water resource supply, conservation, and water quality areas. Staff time for the Youth education program is estimated at 2760 hours for the year.

### Water Management Plan

Since 2002, Aurora Water has created an annual Water Management Plan (WMP) to address drought conditions and demand response. This includes mandatory days of the week watering, hours of allowed irrigation, and enforcement of waste of water.

### **Soil and irrigation system inspections and irrigation plans review**

In order to support and enforce the lawn permit and irrigation standards ordinances, Aurora Water employs water conservation field personnel, an irrigation plans examiner and an irrigation system inspector. In 2008, Water Conservation conducted 1024 soil inspections to ensure proper soil amendment was added and tilled, 857 residential and commercial irrigation systems were inspected and 49 sets of commercial, large HOA, and multi-family irrigation system plans were reviewed for water-efficient design.

Staff time spent on soil and irrigation inspections is estimated at 600 hours for soil inspections, 400 hours for residential irrigation inspections and 180 hours for commercial irrigation inspections. Plans review is estimated at 1200 hours.

City of Aurora's CWCB approved water conservation plan can be found at <http://cwcb.state.co.us/conservation/relatedinformation/wcps/>

### **Arapahoe County Water and Wastewater Authority (ACWWA)**

Arapahoe County Water and Wastewater Authority's (ACWWA) Water Conservation Plan was approved by the Colorado Water Conservation Board in 2007. ACWWA's plan focused on the reduction in per tap water use and an overall reduction in demand. ACWWA has implemented a tiered rate structure and billing system designed to encourage efficiency. Both residential and commercial customers are charged according to an increasing block rate structure.

ACWWA also has aggressively implemented a non-potable irrigation program, using raw alluvial water and treated effluent for landscape irrigation. This allows the maximization of

ACWWA's water supply through reuse for irrigation purposes. ACWWA currently has the 2nd highest number of individual customers using treated effluent for irrigation under the Colorado Department of Public Health and Environments Regulation 84: Reclaimed Water Control Regulation program in the State of Colorado. ACWWA also operates a State approved augmentation plan which increases the utility of its water supply.

ACWWA currently distributes Water Leak Detection Kits which consist of an instructional card and dye tablets to help customers identify leaky toilets within their homes. ACWWA also conducts an outreach program to HOAs within its service area in an effort to educate the consumers on various ways to save water. During the peak usage months, ACWWA has implemented a Watering Schedule, which assists in maintaining an efficient water management/operations program, including conservation.

In 2010, ACWWA will begin a pilot rebate program for customers who purchase high efficiency clothes washers and sprinkler controls that respond to the weather. ACWWA also has plans to modify their current web page to include increased awareness of water conservation with links to other helpful resources.

ACWWA's CWCB approved water conservation plan can be found at <http://cwcb.state.co.us/conservation/relatedinformation/wcps/>

### **City of Brighton**

On August 11, 2008, the Colorado Water Conservation Board approved the City of Brighton's updated Water Conservation Plan. Although the City of Brighton has had an approved Water Conservation Program in place since 1995, the City recognized the need to develop, implement, and monitor additional

measures and programs in order to achieve additional savings and reduce water use demands.

The water conservation measures and programs are focused on those activities that will occur over the next ten years. Through initial screening efforts the potential programs identified include:

- Water efficient fixtures and appliances
- Low water use landscaping, drought- resistance vegetation, efficient irrigation
- Water efficient industrial and commercial processes
- Water reuse systems
- Distribution system leak identification and repair
- Public education and customer audits
- Water rate structure and billing systems that encourage water efficiency
- Regulatory measures
- Incentives including rebates

Due to limited budgets, annually approximately \$30,000, the City will focus on programs expected to provide the largest results, with some programs implemented and/or retired over time. Central to the City's desire to reduce future water demand is its need to postpone future capital improvement projects to expand both its water and wastewater treatment facilities. The City will need to continuously weigh the cost/benefit of various water conservation measures and programs with the cost to develop, treat and deliver new water supplies.

The estimated water savings that the City's water conservation efforts are expected to yield from 98 acre-feet to 123 acre-feet for a total cumulative savings of 1,051 acre-feet in 10 years. The expected overall cost to implement

the plan over the next ten years is \$3.9 million therefore; the City will be pursuing water efficiency grants with the CWCB Office of Water Conservation and Drought Planning. The City will monitor the progress of its proposed water conservation programs such that the actual water savings are tracked and reported on a regular basis to the City Council and the public.

City of Brighton's CWCB approved water conservation plan can be found at <http://cwcb.state.co.us/conservation/relatedinformation/wcps/>

## **Castle Pines Metropolitan District**

On October 15, 2009, Castle Pines Metropolitan District (CPMD) submitted a Water Conservation Plan to the Colorado Water Conservation Board (CWCB) for review and approval. This Plan complies with the Water Conservation Act of 2004 and follows the Water Conservation Plan Development Guidance Document established by the CWCB. The draft plan was available for public review and comment from July 27, 2009 to September 26, 2009.

The scope of the Water Conservation Plan (Plan) include water conservation goals, cost/benefit analyses for various chosen conservation activities as well as those not chosen for implementation, descriptions of selected activities, and the specific protocol for implementation of chosen activities. The Plan indicates that CPMD will evaluate each conservation activity. Specifically, CPMD has and will evaluate the actual cost/benefit ratios compared to the projected cost/benefit ratios of each conservation activity. Copies of the Plan are available on the website [www.castlepinesmetro.com](http://www.castlepinesmetro.com).

The conservation goal focused on the highest water use categories and is identified in the Plan as 16% reduction in peak day demand. CPMD

plans to attain this goal through the following activities:

- 4-tiered block rate structure
- Educational seminars for residents
- Educational seminars for landscape contractors working within CPMD's service area
- Water-wise demonstration garden available to public
- Residential and commercial water audits conducted by staff
- Advanced leak detection for distribution system
- Residential and commercial rebates for installation of weather-based irrigation technology
- Residential and commercial rebates for installation of tipping bucket rain gauges
- Residential and commercial rebates for irrigation system repairs
- Residential and commercial rebates for sub-soil improvement and existing plant replacement with water-wise plant material
- Irrigation Plan submittal and approval for retrofits or new landscape installation
- Irrigation system audits provided by third party organizations
- Reuse water supplied to both golf courses for irrigation

CPMD teaches by example through its indoor and outdoor water conservation activities which include installation of five dual-flush toilets in its office building and use of a central irrigation control system that utilizes on-site weather data to manipulate amount of water applied through irrigation events.

CPMD has witnessed conservation success even though the Plan has not yet been approved by the CWCB. A major success in 2009 was one Sub-association used 2.7 MG less water than the average used between 2004 and 2008. This was accomplished through intense educational efforts and communication between

CPMD, a Sub-association Board member and the Sub-association landscape manager on irrigation repairs, leak detection, and central irrigation control system management.

More successes include 30 to 50 % water use reductions due to ET Controller installations, irrigation repairs, and irrigation clock management in single-family residences.

## **Castle Pines North Metropolitan District**

### **Introduction**

The Castle Pines North Metropolitan District currently serves approximately 3,200 single family residential homes and some retail development. The current population of Castle Pines North is approximately 9,600 people. The current service area covers approximately 3.8 square miles of land. The District is approximately 93% built out with only 240 empty single family lots available. Currently the Castle Pines North Metropolitan District is supplied by 11 Denver Basin groundwater wells. During the irrigation season wastewater return flows generated by the Castle Pines North Metropolitan District are delivered to a non potable reuse system that is used to irrigate The Ridge Golf Course.

On June 19, 2006 the Castle Pines North Metropolitan District became the first entity in the State of Colorado to develop and adopt a water conservation plan in accordance with the recommendations outlined in the Colorado Water Conservation Board's (CWCB) Water Conservation Plan Development Guidance Document. Castle Pines North Metropolitan District's Conservation Plan became the model document and its format has been copied by many other entities throughout the State of Colorado.

### Conservation Plan Goals

The Conservation Plan established by the Castle Pines North Metropolitan District (CPNMD) plan established six goals that are shown below.

1. Provide a water savings target of an additional 175 to 220 acre-feet per year (AFY) based on 2003 water demand patterns (16 to 20 gallons per capita per day [gpcd] based on projected population at build out) through existing and additional conservation measures and programs.
2. Select conservation measures and programs that target outdoor irrigation and customers of high use. Target customers include the following:
  - Residential (indoor and outdoor usage)
  - District irrigation of parks and open space
  - HOA irrigation
3. Closely monitor District irrigation on parks and open space.
  - Maintain 2005 irrigation levels on parks and drip irrigation
  - Reduce open space irrigation by an additional 10 percent (5.9 AF) with a total outdoor District usage not to exceed 93 AFY. (District metered usage in 2005 was 98.9 AF)
4. Provide assistance to the homeowner associations in reducing irrigated turf by 25 percent.
5. Select conservation measures and programs that is compatible with the community.
6. Establish a monitoring system that collects a sufficient amount of data to effectively

measure the success of conservation programs and measures on an annual basis.

### Rate Structure

In June 2004 the Castle Pines North Metropolitan District implemented one of the most innovative tiered water rates structures in the State of Colorado. This Inclining Block Rate Structure is unique in that it uses average monthly irrigation requirements in addition to actual lot size to determine a customer's monthly water budget. In other words, every month each and every lot has a separate and unique irrigation water budget. In conjunction with the monthly water budget the District has also implemented a four tier pricing system. The 2009 residential water rates and tiers are shown below.

#### Residential Water Usage, Per 1,000 Gallons, Per Month

Tier 1 \$ 3.30 within budgeted gallons

Tier 2 \$ 4.28 100.01% - 120% over budgeted gallons

Tier 3 \$ 5.96 120.01% - 140% over budgeted gallons

Tier 4 \$ 11.38 Greater than 140.01% over budgeted gallons

\*Winter Budget = 9,000 gallons at Tier 1

### Rebates

In addition to implementing the Tiered Water Budget as described above the District has been offering rebates to its customers since 2005. Currently the Castle Pines North Metropolitan District is offering the following rebates:

| Item   | Benefit   | Rebate: Up To  |
|--|---|--|
| <b>Rain Sensors</b>  | Overrides irrigation system by detecting rainfall.  | \$100<br>(Limit one per household)   |
| <b>Programmable Irrigation Clock</b>                       | Sets time limits to help conserve water; allows every 3rd day cycle.  | \$75<br>(Limit one per household)  |
| <b>ET Controller (Residential)</b>                         | Regulates irrigation based on climatic factors (e.g. temperature & humidity) that influence evapotranspiration. | \$200<br>(Limit one per household)   |
| <b>ET Controller (HOA/Commercial) Effective 6-1-2009</b>   | Same as Residential.  | Varies<br>For single controllers with 24 or more zones, rebate will equal 50% of purchase price. For smaller controllers, rebate will be \$200 for every 6 zones. Plans must be approved by the District in advance. |
| <b>Sod Replacement (Residential)</b>                       | Uses xeriscaping and/or artificial turf to replace sod and/or high maintenance grass/plants.                    | \$0.40/sq. ft.<br>(500 sq. ft minimum – 4,000 sq. ft. maximum – Plans are to be approved by the District in advance.   |
| <b>Sod Replacement (HOA/Commercial) Effective 6-1-2009</b> | Same as Residential.  | Up to \$0.40/sq. ft.<br>(500 sq. ft minimum – no maximum limit. – Plans are to be approved by the District in advance.   |
| <b>Low Flow Toilets</b>                                    | Uses 1.6 gallons per flush; Old toilets use three to five gallons per flush.                                    | \$100 / toilet<br>(Limit three per household - applies to replacement toilet ONLY)   |
| <b>Front Loading or Low Usage Washing Machines</b>         | Uses 27 gallons or less per load; less efficient machines use up to 45 gallons per load.                        | \$125 / machine<br>(Limit two per household)   |
| <b>Water Efficient Showerhead (NEW)</b>                    | Uses 2.4 gallons per minute vs. 4 gallons per minute.   | \$10/showerhead<br>(Limit four per household – applies to replacement showerheads ONLY)  |

On average the District has expended approximately \$25,000 per year on rebates. In 2009, the District has expended over \$36,000 in rebates which equates to approximately 2% of overall water sales revenue.

### **Other Conservation Programs**

In September 2007 the Castle Pines North Metropolitan District was given a grant by the Colorado Water Conservation Board for the purchase and installation of a computerized irrigation control system. The system selected by the Castle Pines North Metropolitan District is known as the Calsense Control System. The Castle Pines North Metropolitan District became the first entity in the State of Colorado to implement this sophisticated system. Currently this system monitors and controls all of the District's four parks and several large areas of irrigated open space. The system monitors, temperature, precipitation, humidity and automatically adjusts irrigation system run times on a daily basis. This control system automatically shuts down individual zones that may have developed a leak from either a missing head or a pipe break. This system alone has saved the District hundreds of thousands of

gallons of water over the past two years. The District is currently in the process of offering the use of this system to several large Homeowners Associations in the Castle Pines North Community.

In Calendar Year 2008 the District, working in conjunction with several water conscious homeowners to develop a water conservation outreach program aimed at elementary school students. This program became known as WARP (Water Awareness Responsibility Program). Castle Pines North Metropolitan District's proactive support of this innovative water conservation program has enabled the program to be expanded throughout the Douglas County School system and has been presented to thousands of students throughout Douglas County.

In addition to the programs described above the Castle Pines North Metropolitan District has implemented a wide variety of water saving programs and projects that clearly demonstrate the District's commitment to water conservation. Those programs and their approximate cost are listed below:

| <b>Project Name</b>  | <b>Cost</b> |
|--|-------------|
| Installed approximately 1.54 Acre of Water efficient turf on Monarch Blvd.     | \$ 250,000  |
| North Open Space Xeriscape Demonstration Garden                                | \$ 80,000   |
| Landscape Master Plan replace turf in street rights of way with Xeric Material | \$1,000,000 |
| Remove one acre of Turf in North Open Space and replace with Native Grass      | \$ 25,000   |
| Install Synthetic Turf Soccer Field at Lagae Park                              | \$ 500,000  |

### **Summary**

The District number one goal as established in its water conservation plan was to reduce water use by 16 – 20 gallons per capita day as compared to 2003 water use. In 2003 the per capita water use for Castle Pines North

Metropolitan District was approximately 178 gallons per capita day. In 2009 the gallons per capita day was reduced to approximately 142 gallons per capita day which far exceeds the goal of 20 gallons per capita day reduction

established in the Castle Pines North Metropolitan District's Water Conservation Plan.

Castle Pines North Metropolitan District's CWCB approved water conservation plan can be found at

<http://cwcb.state.co.us/conservation/relatedinformation/wcps/>

## Town of Castle Rock

In December 2006 the Town of Castle Rock (Town) adopted a Water Conservation Master Plan (Master Plan). The conservation goals identified in the 2006 Water Conservation Master Plan include:

- Reduce current and future water demands – Specifically reduce average water consumption by year 2030 from 165 gpcd to 135 gpcd. Only three years after adoption of the Master Plan, the Town's gpcd consumption is already reduced by over 10%.
- Create a community culture that includes water conservation
- Ensure financial stability

The implementation strategies identified in the 2006 Water Conservation Master Plan include:

- Implement landscape regulations for new development that result in efficient use of water, is aesthetically pleasing, and enhance the type of land use
- Implement incentive programs that encourage existing properties to be water efficient and aesthetically pleasing
- Implement rate strategies, such as a water budget rate structure, that reward efficient water use and discourage water waste; and
- Implement public education programs that allow the Community to make conservation a way of life.

Since the adoption of the Master Plan, the Town has implemented all of the strategies listed

above with great levels of success and vast community support and participation.

- **Landscape Regulations & Principles.**

In July 2003, the Town adopted the Landscape Regulations & Principles.

The plan is currently being updated and will require "water-wise" landscape designs for all nonresidential, residential builders, and multi-family developments. Ultimately, the goal will be to move away from the current three-day watering schedule as a demand management tool, and instead encourage smart landscaping practices that reduce water consumption.

- **Conservation Rebates.** Beginning in 2006, the Town implemented three conservation rebates for all qualified Town customers. In June 2009, the Town added three more rebates. The conservation rebates include:

- SMART Irrigation Controller
- High Efficiency Washer
- Three-day programmable Timer
- Rotary Nozzle Replacement
- Rain Sensor
- Smartscape Renovation

- **Water Budget.** In August 2008 the Town transitioned from an inclining block rate structure to a "water budget" rate system for all non-residential customers. The water budget rate system for residential customers followed in August 2009. Currently, the Town employs two seasonal employees to patrol and monitor water usage and adherence to the mandatory watering schedule. The revenue generated from watering violations has funded the conservation education and rebates programs.

- **Conservation Education.** Town staff has developed and administers frequent "Water Wiser" classes for customers concentrating on water conservation

practices, maintenance and management of sprinkler systems, and principles of Xeriscape. The Town also maintains several Xeriscape demonstration gardens open to the public with signage to identify plants and care instructions.

- **Landscape Retrofit Projects.** The Town has recently completed 2 different projects, totaling over \$500,000 to retrofit water thirsty median landscaping into water wise Xeriscape designs and efficient irrigation designs. Projects like this are anticipated to save hundreds of thousands of gallons each irrigation season.

Town of Castle Rock's CWCB approved water conservation plan can be found at <http://cwcb.state.co.us/conservation/relatedinformation/wcps/>

## **Centennial Water and Sanitation District**

On February 24, 2009, the Colorado Water Conservation Board approved the updated Water Conservation Plan of Centennial Water and Sanitation District. The Water Conservation Plan meets the requirements of the Water Conservation Act of 2004 and Colorado Revised Statute 37-60-126.

Centennial's Water Conservation Plan includes the evaluation of a number of existing and potential water conservation measures. Below is an explanation of current water conservation activities as well as those recommended for future implementation in the Water Conservation Plan.

### **Current Water Conservation Activities**

#### ***Conservation Promoting Rate Structure***

In the spring of 2003 CWSD was the first water provider in Colorado to adopt the water budget rate structure as a means to encourage water

conservation through water rates. This new rate structure provided individualized water budgets for all accounts and emphasized the importance of staying within that budget with a financial impact on customers who used more water than their allocated water budget. The water budget rate structure has played an important role in the water savings that Centennial Water has experienced through its conservation program. Residential water budgets are formulated with an indoor and an outdoor component. The indoor component is 12,000 gallons every two months based on an assumed 65 gallons per capita per day for a family of three. Customers can sign an affidavit to receive an additional indoor allowance for larger families.

The outdoor component is based on the customer's actual lot size multiplied by an irrigable area factor of 45 percent. The 45 percent irrigable area factor was established based on a sample of aerial images for typical Highlands Ranch homes. An allowance of 27 inches of water based on historical evapotranspiration (ET) rates for the area, minus average annual measurable rainfall, is provided. These budgeted outdoor amounts are then allocated based on historical ET for the weeks within each billing cycle.

Non-residential irrigation customers are budgeted similarly to the outdoor component of residential customers. The difference is that non-residential customers receive a budget based on actual irrigated area regardless of plant type. The customer is responsible for supplying the landscape area data to the District.

Non-residential indoor water budgets are calculated based on the size of the meter servicing the business. Each customer is allotted 189,000 gallons per  $\frac{3}{4}$ " equivalent.

## ***Rates***

| % of Budget | Residential |         |
|-------------|-------------|---------|
|             | Summer      | Winter  |
| 0-100 %     | \$ 2.55     | \$ 2.55 |
| 101 - 120%  | \$ 3.50     | \$ 3.50 |
| 121 - 140%  | \$ 5.25     | \$ 3.50 |
| Over 140 %  | \$ 7.90     | \$ 5.80 |

| % of Budget | Non-Residential |            |
|-------------|-----------------|------------|
|             | Indoor          | Irrigation |
| 0-100 %     | \$ 2.55         | \$ 2.55    |
| 101 - 120%  | \$ 3.50         | \$ 4.00    |
| 121 - 140%  | \$ 3.50         | \$ 7.00    |
| Over 140 %  | \$ 5.80         | \$ 12.00   |

There have been several issues that have been addressed since the adoption of the water budget in 2003.

- Adding a permit program to increase the water budget over a 3 week period once per year for customers wanting to add new sod or make repairs in April, May, September or October discourages planting during the heat of the summer.
- A variance for households with a population greater than three persons supports fairness throughout the service area.
- Water budgets were increased by 1,000 gallons per equivalent per month during the winter to accommodate winter watering of trees and shrubs, enabling customers to care for their landscape during the winter months.
- In 2007 the non-residential irrigation water rates for water use above 100% of budget were increased in order to help encourage water conservation in that customer group.
- In December 2007 non-residential indoor water budgets were changed from allotments based on historical usage to an allotment based on meter size as state above. Budgets based upon historical usage were not effective in promoting water conservation.
- In 2009 all irrigation customers using non-potable irrigation were assigned

irrigation budgets similar to potable water customers. Previously, non-potable customers were billed at the base non-potable rates as per our rules and regulations.

The water budget rate structure has been well received by customers of the District, and has been a successful water conservation measure. The flexibility of the water budget rate system allows the District to adapt to different issues as they arise.

## ***Metering***

The District has been 100 percent metered since construction began in 1981. Commercial irrigation only meters have been encouraged since 1981 and since 2003 commercial combination indoor and irrigation meters are no longer allowed. Centennial Water has an ongoing program to conduct maintenance, sample meter accuracy and replace aging meters on a scheduled basis. Residential water meters are repaired or maintained in compliance with American Water Works Association standards. Commercial meters are pulled annually and checked for accuracy. Any repairs or maintenance is also done at this time.

## ***Water Conservation Specialist***

In 2004 the District hired a full-time Water Conservation Coordinator to oversee the direction and implementation of its water conservation programs. Technical assistance is offered for both indoor and outdoor water conservation techniques including but not limited to water use audits, leak detection, appliance water use, landscape materials, irrigation efficiency and controller scheduling. In addition the water conservation coordinator conducts public education programs, evaluates water conservation measures, and manages the water monitors employed during the irrigation season.

### ***Water Efficient Fixtures and Appliances***

In accordance with the District's rules and regulations, and the uniform plumbing code, low-flow or water efficient plumbing devices are required on all new construction. In 1992 the U.S. Congress passed the U.S. Energy Policy Act which established maximum allowable water flow rates for plumbing fixtures. Beginning January 1, 1994 all plumbing fixtures sold in the U.S. met these requirements. Seventy percent of homes in Highlands Ranch were built in 1994 or later. Seventy three percent of commercial construction occurred in 1994 or later.

### ***Water Reuse Systems***

Centennial Water's water reuse system of legally reusable water consists of two methods: (1) further treatment and direct reuse of reclaimed wastewater for irrigation and (2) recapture by direct diversion or exchange of reusable water discharged to the South Platte River including indoor return flow and lawn irrigation return flow credits. Currently the Waste Water Treatment Plant, Redstone Park, the Highlands Ranch Golf Club and the Wind Crest Assisted Living development use reclaimed water for their irrigation. In 2009 additional filters were purchased to increase capacity of the reclaimed irrigation water system from 3 MGD to 7 MGD. In 2006, 281 AF of reuse water was used for irrigation, and 3,873 AF was recaptured or exchanged, resulting in a total of 4,154 AF of water that would have otherwise been supplied through either surface or groundwater resources.

### ***Leak Identification and Repair***

A distribution system leak identification and repair system is used by the District. Using sophisticated leak detection equipment, District staff can locate leaks within the distribution system and perform the necessary repairs.

### ***System Audits***

System wide audits are conducted by the District annually to determine the efficiency of the water

distribution system. There are three pieces of data used to perform this evaluation: total water production, total water billed to customers and water accounted for, but not billed. The water unaccounted for is calculated by subtracting all accounted for water (total water billed and accounted for/not billed) from the total water production. The American Water Works Association guidelines consider up to 10 percent unaccounted for water to be acceptable. Over the past 11 years, the average percentage of unaccounted for water was 6.79 percent, showing that the District's water system is consistently within an acceptable range.

### ***System Pressure Management***

The District's water system contains five different pressure zones that are monitored at the water treatment plant for safety and optimal service. In addition service pressure regulation is mandated by the District on domestic water service lines and irrigation service lines.

### ***Education/Information***

#### ***Dissemination/Xeriscape Promotion***

The District has a continuous public education program to help inform its customers of ways to conserve water both indoors and outdoors. This program includes:

1. **Water conservation workshops** are offered throughout the year to both residential and commercial water users to promote water use efficiency.
2. **Water education literature** is available at the District office building and is handed out at all public events.
3. Free **home water management kits** that include a shower timer, rain gauge, shower/faucet flow bag, toilet leak detection tablets and the above literature. These kits are also available at the District office building and all public events.
4. **Promotion of low water use landscapes and efficient irrigation**

**practices** with xeriscape literature, workshops, and demonstration gardens.

5. **Water conservation section on the District's web page** has all of the aforementioned literature available to residents. The web page also contains links to other resources that will help customers conserve water.
6. **Water monitors** patrol the service area during the summer months to ensure compliance with mandatory water conservation measures and help educate customers.
7. **Collaboration** with water conservation groups in the South Metro area, such as the Douglas County Water Resource Authority, to share and partner in water conservation efforts.

### ***Regulations/Ordinances***

Centennial Water and Sanitation District has placed several regulations governing the direct use of water in the rules and regulations.

- Outdoor sprinkler irrigation is prohibited from 10 a.m. until 6 p.m. daily. The District also recommends that customers follow a voluntary three day per week watering schedule.
- Hand watering trees, shrubs and plants is allowed at any time, as long as a hose is held or a water conserving method is used (such as a drip, micro spray, deep root watering device or watering can).
- Wasteful water practices, such as allowing excess water to flow in street gutters and neglecting to repair leaks, are prohibited.

Water monitors are used throughout the irrigation season to both ensure water regulation are followed as well as provide education to customers throughout the community. In 2009 501 residential customers were contacted by water monitors with 422 receiving a warning for violating watering restrictions. 27 non-residential customers received watering violations in 2009.

### ***Technical Assistance***

**Water audits** are conducted by District staff at homes and businesses that request this service or have been determined by staff to have irregularly high use.

Through partnership with the Center for Resource Conservation **irrigation audits** are available to residential, commercial and home owner association customers. The purpose of offering irrigation audits to the Districts customers is to help improve irrigation efficiency. In 2009, 221 residential audits and 6 large property audits were performed, totaling 595 audit hours. Approximately \$30,000 dollars were spent on irrigation audits in 2009.

The District hosts annually a **Certified Landscape Irrigation Auditor class and exam** offered by the Irrigation Association for local landscape contractors and designers. This course is designed to increase the knowledge and skill level of landscape contractors and designers in the area of irrigation efficiency.

### ***Residential Toilet Rebate (Pre-1994 Construction)***

This program is targeted at the homes built in Highlands Ranch before January 1, 1994. Beginning in 1994 all toilets sold in the United States were required to meet the low-flow standard of 1.6 gallons per flush established by the Environmental Protection Agency. This program provides a \$75 dollar rebate for customers who replace older high volume toilets.

The program started in August of 2009 and as of December, the District has replaced 184 toilets at a cost of \$13,800.

### **Future Water Conservation Activities**

Through development of the approved Water Conservation Plan, several measures were

identified for possible future implementation. Those measures are described below.

### ***Commercial Pre-Rinse Sprayer***

Pre-rinse sprayers rinse large food waste from pots, pans, utensils, and dishware before they enter a dishwasher. Water conserving valves use less water and have equal to or better rinsing effectiveness due to improved spray pattern.

### ***Non-Residential ET Controller Rebate***

Evapotranspiration, or ET, is the amount of water used by plants through the combined processes of evaporation and transpiration. ET controllers automatically change the irrigation controller settings to apply only the amount of water needed to replace ET. It is estimated that 15 percent of water used to irrigate landscapes can be saved when using ET controllers.

### ***Residential and Non-Residential Rain Sensors***

Rain sensors are devices that automatically interrupt the regular irrigation schedule in the event of a rain storm. This program would provide an incentive for homeowners, businesses and home owner associations to install rain sensors.

### ***Non-Residential Turf Replacement Rebate***

This program would provide an incentive to replace high water using turf with low water using plant materials. By replacing turf with more water efficient plant materials and following the principles of xeriscape, it is estimated that the landscape would use between 30 to 50 percent less water.

Ongoing monitoring and evaluation of current and future conservation measures is planned by Centennial Water to ensure cost-effectiveness and actual water savings. To date, it is estimated that the water conservation program consisting of the measures and programs listed above saves approximately 2,000 acre-feet

annually, or 11,500 acre-feet since 2003. Centennial Water has identified a water conservation goal of an additional 1,000 acre-feet annually. In order to meet this goal Centennial currently budgets approximately \$200,000 per year for water conservation.

Centennial Water and Sanitation District's CWCB approved water conservation plan can be found at

<http://cwcb.state.co.us/conservation/relatedinformation/wcps/>

## **Center of Colorado Water Conservancy District**

Center of Colorado is a water conservancy district formed under C.R.S. 37-45-101, et. seq. Its jurisdictional boundaries encompass all of Park County, which is the headwater county for most of the major tributaries for the South Platte River. Unlike most of the other municipal participants in the Chatfield reallocation project, Center of Colorado does not provide treated/potable water to residential and commercial customers. Rather, Center of Colorado intends to use its 0.64% of the project allocation in Chatfield Reservoir as part of its county-wide plan for augmentation. Park County is a rural county with a primarily decentralized population base. Thus, unlike in the more densely populated urban centers along the Front Range, most of the water users within Park County are not connected to central water and wastewater systems, but rather, operate their own wells and diversions. Under its plan for augmentation, Center of Colorado sells and leases augmentation water to commercial, industrial and domestic users to augment depletions caused by the individual user's wells and/or surface water diversions. Since it does not supply municipal water directly to customers, Center of Colorado has not adopted a water conservation plan in the manner of the other

municipalities and water districts who are members of the Chatfield reallocation project.

However, Center of Colorado, as part of its augmentation plan, has in place guidelines and rules and regulations that lead to the conservation and promote the efficient use of water resources within its service area. These include the following:

- All water users under the plan are required to be metered, thus all water used is strictly accounted for and leakage and overuse can be identified and remedied.
- The average consumption of water per capita for in-house domestic uses is 0.026 acre feet per year which is very low by municipal standards.
- Large tracts of lawn irrigation are discouraged and the plan has implemented a specific rate structure for lawn irrigation.
- Center of Colorado has prioritized the allocation of its augmentation water supplies with first priority going to:
  1. Existing water users who are currently out of compliance;
  2. Commercial and industrial users;
  3. Domestic users, including persons who wish to upgrade their types of use.

## **Cottonwood Water and Sanitation District**

As part of our efforts to develop a Water Conservation Plan for Cottonwood Water and Sanitation District, the District reviewed the plans of Denver Metro Area water providers. The model used was simply based on promoting

reduced water consumption by providing an equitable allocation of the water supply to each of its customers based upon the volume of water a customer reasonably needs, and significantly increasing rates beyond the allocation.

Summarized below is the water conservation plan for Cottonwood that began May 1, 2003. The plan features include an indoor and irrigation allocation, cash incentives for the installation of low flow fixtures, and an increasing block rate structure.

### **An annual in-home/commercial allocation based on the average historic consumption.**

The annual indoor allocation for a residence is based the non-irrigation months of January/February 2003. Analysis of these two months indicates that the average per person consumption is approximately 65 gallons per day assuming an average of 3 people per single family home.

We recognize that the proposed allocation is for a typical household of three people and that there will be families that have either more or less than the basis for the typical. The proposed plan would increase the indoor allocation by 1,860 gallons per month per person for each person living in the home above 3.

On the commercial side, the allocation is simply based on the average monthly consumption during January and February 2003. In the case of the multi-family homes, the allocation will be based on the number of occupied units per meter times an average of 2.2 people per unit and 65 gallons per person per day. This allocation is identical to the single-family home allocation with exception to the number of people 2.2 (multi-family) versus 3 people per single family home. As with the single-family homeowners, if and when the occupancy increases, the allocation will be increased.

### **Annual irrigation allocation based on 30-inches over the landscape area.**

The annual irrigation allocation is based on the providing sufficient water for a healthy lawn. According to Colorado landscape experts, Kentucky bluegrass requires approximately 24 to 30-inches of water per year to remain healthy. Therefore, we propose that each single-family homeowner receive an allocation of approximately 54,200 gallons based upon 30 inches per year for irrigation. This allocation is based on an average landscape area of 2900 square feet and makes no distinction between grass and shrubs. Again, as with the in-home allocation, if the landscaped area can be shown to be greater than the average, the allocation would be increased.

Similarly, the commercial sites will receive an allocation based on the total irrigated acreage times 30 inches per year of irrigation. The amount of irrigated acreage for the commercial sites will be based upon measurements made from aerial photography, or from field estimates.

### **An increasing block rate structure consisting of a fixed fee plus a consumption charge:** (2009 rates)

Fixed Fee - Collected to cover the fixed costs of the District:     \$16.06 /month

“Water Conserving” Rate – Base rate charge for consumption up to the property’s allocation:  
\$3.10 /1000gallons

“Excessive” Rate – Twice the “Water Conserving” Rate for consumption from 100% to 150% of the property’s allocation: \$6.20/1000 gallons

“Abusive” Rate – Three times the “Water Conserving” Rate for consumption above 150% of the property’s allocation: \$9.30/1000 gallons

### **Cash incentives for the installation of Ultra Low Volume toilets, Water Wise Washing Machines and Low flow fixtures.**

Cottonwood Water instituted a rebate program, similar to Denver Water’s, for the purchase and installation of Ultra Low Volume (1.6 gals versus 3 to 5 gals for the standard) toilets, low flow shower heads and purchase of horizontal axis/front loading washers. The rebate program consists of a \$100 cash incentive for each ultra low flush toilet (three per household) that is purchased and installed by the customer, \$125 rebate for horizontal axis/front loading washers (one per household) and \$20 each for each low flow shower head (three per household). The program is limited to \$50,000 on a first come first basis. We require that the customer provide proof of purchase and evidence of installation of the new toilets, washers, and low flow showerheads. A conservative estimate shows that if all 1520 single-family homes replaced an average of two toilets each with a total of 6 flushes per day, this would reduce consumption by approximately 16 acre-ft.

In summary, the water conservation plan described above is intended to reduce consumption rather than restrict water usage and thus extend the economic life of the groundwater supply.

### **Central Colorado Water Conservancy District**

*CCWCD is committed to natural resource management. We deliver water with extreme efficiency, ensure that our members have the latest irrigation technology, and support critical water science research. Our programs have received national recognition, with organizations providing over 1.5 million grant dollars.*

### **Colorado Agricultural Conservation Outreach (CACO)**

CACO is our premiere conservation program. It supplies ultra-efficient irrigation equipment to farmers, and provides outreach seminars and in-field conservation services to the Colorado public. In two years, over \$150,000 of precision irrigation equipment has been awarded to irrigators.

### **CCWCD Contract Audit**

Drought conditions demand accurate water accounting. CCWCD is sitting down with every member of its irrigation community, unrolling a map, and discussing how water moves on their farm. With this data, CCWCD will manage its water with unparalleled accuracy.

### **Conservation Science and Research**

Central is partnered in two, long-term water science studies. With the United States Geological Survey (USGS), CCWCD is investigating water use efficiency and aquifer return flows of flood and pivot irrigation systems. With the Colorado State University, CCWCD is photographing the land with an airplane equipped with multispectral remote sensing. These pictures will reveal irrigation uniformity and the efficiency of various irrigation methods. In addition, CCWCD is actively collecting water quality data throughout the region, utilizing its extensive network of monitoring stations.

### **Water Metering and Telemetry Program**

Every well pumping within the district must have a flow meter, and in the past 5 years, CCWCD has installed over 1000 meters on irrigation wells. Now the first phase is complete, and CCWCD is currently installing radio telemetry on 200 of its flow meters. This equipment will provide real-time data feeds about irrigation pumping, and will be transmitted to our website for member reference and CCWCD's accounting.

### **Green Reservoir Design**

CCWCD spearheads a new type of "green" reservoir: a small, natural looking depression where water is allowed to rest, and infiltrate into the ground. By making reservoirs this way, water managers can clean surface water through a filtration process similar to home water purifiers. In addition, connecting the reservoirs with the natural hydrology of the region allows for storage capacity greater than traditional designs, and conserves energy by moving water with gravity and natural hydrological flows. These sites provide a wildlife benefit by establishing critical ephemeral pools for migrating waterfowl, boosting recreation and environmental education potential at the sites.

### **Denver Botanical Gardens**

In 2009, DBG Chatfield installed a computerized Rainbird ET Site Controller with a weather station to monitor garden and turf irrigation on the site. This system allows DBG Chatfield to irrigate to about 80 % of evapotranspiration rate of turf and gardens. Additionally, all gardens constructed at Chatfield utilize native, water efficient plants that minimize the need for supplemental irrigation. This system controls about 90% of all Denver Water used on the site and will be expanded as funding allows.

Additionally, soil for new turf and gardens planted on the site, is amended with 3 cubic yards of organic compost per thousand square feet prior to planting, to increase water holding capacity. This was started in 2008 in cooperation with Denver Water when the amphitheater was constructed.

In the next two to three years, we are planning to utilize underground, drip irrigation on our 10 acres of pumpkins and 7 acres of vegetable crops. This system will be controlled by Rainbird ET Site Controller as well.

### **Mount Carbon Metro District**

Mount Carbon Metropolitan District is currently reviewing water conservation measures and will develop appropriate incentive and regulations to promote efficient use of water within the district. The district has already initiated a water use monitoring program to record water use and assess water losses within the system. Incentives and regulations for future water conservation within the district will include the following:

- Commercial and Residential High-Efficiency Toilets and Urinals
- Commercial and Residential Smart Irrigation Systems
- Residential High-Efficiency Clothes Washers
- Xeriscape Programs

In addition to these incentives, the district will provide consumer education information to promote water conservation for all customers. Tiered rate structures and water restrictions during drought conditions will also be part of the water conservation measures.

### **Perry Park Country Club**

In 2004, Perry Park Country Club installed a state of the art irrigation system with individually programmable sprinkler heads and an on-site weather-evapotranspiration station. This system can conserve water in dry years by limiting irrigation to critical greens, tees, and fairways areas.

Following installation, each individual head was percent adjusted to only irrigate the minimum water required to keep the Club's turf healthy. Since installation, approximately \$10,000 is spent annually for system upkeep allowing the system to continue to run at full efficiency.

In 2008, wireless sub-surface soil sensors were installed to increase efficiency of the system. Along with the Club's on site weather station, these sensors are monitored daily to provide the

data necessary to apply the minimum water required for our turf.

After initial installation, the Club has averaged a 25 percent annual savings of water use from the previous irrigation system. This equates to conserving about 45 acre-feet annually. The sub-surface probes have added an additional 3 percent savings or 3.9 acre-feet annually.

And finally, remote access has recently been added to the operation of the Club's irrigation system. This feature allows for monitoring and operation anywhere Internet access is available. Any sudden condition changes (i.e. weather, ET rates) can be monitored and the system can be shut off or adjusted remotely.

All of these upgrades, along with extensive training and education, continue to conserve water at Perry Park Country Club for now and the foreseeable future.

### **Pinery Water and Wastewater District**

The Pinery Water and Wastewater District has a Water Conservation Plan that was approved by in 2002. A Draft of a new Water Conservation Plan has been submitted to CWCB and comments have been received. The Pinery is working on finalizing the plan for resubmission to the CWCB before the end of the year.

The new plan builds on the conservation programs already in place and has a heavy focus on reducing the outdoor demand within the District. A reduction of indoor water use is also part of the program but it is felt that the opportunities for significant conservation savings are greater with a stronger focus on outdoor use. The focus on outdoor is in part driven by the fact that there was a 20% reduction in outdoor use when the District imposed voluntary watering restrictions during the drought of 2002 and 2003.

The Pinery currently has in place an aggressive tiered rate structure which provides a significant water conservation incentive. The District also provides courtesy meter reads on request so customers can better understand how much water they use during an irrigation cycle. Currently customers are billed bi-monthly and the courtesy meter reads are a way to provide more timely information to customers without altering the current billing arrangement. The District is working to implement monthly billing and plans to have new meter routes in place in 2010 for a possible conversion to monthly billing in 2011. Monthly billing will also provide a mechanism for monitoring of system wide leakage and changes in usage.

The education component of the Pinery's program is primarily contained in regular newsletters to customers. In addition the District has toilet test tablets and water conservation kits available in the main office. Copies of the newsletters can be found on the District's website at <http://www.pinerywater.com>. The Pinery also is an active member in the Douglas County Water Resource Authority which is providing HOA education and training as well as focus on water conservation education in the schools.

The Pinery operates under a state approved augmentation plan that allows for credits for return flows from the District's wastewater treatment plant as well as credits for lawn irrigation return flows. The District exchanges these return flows on Cherry Creek to provide additional water to its customers.

## **Roxborough Water and Sanitation District**

Roxborough Water and Sanitation District (RWSD) has successfully implemented a combination of water conservation measures resulting in per capita water use well below average for the Front Range Area. The primary

components of RWSD's conservation program include watering restrictions, education, conservation pricing, customer consumption monitoring, and conservation rebates. Since 2002, RWSD's water conservation efforts have reduced per capita water use by over 16%. The average water consumption for RWSD residential units is 83,000 gallons per year, or 90 gpcd, approximately one half of the per unit residential consumption experienced by some of the major water providers in the area.

### **Watering Restrictions**

Watering restrictions have proven to be the most effective method for reducing water demand, and RWSD restricts outdoor watering to two days per week. Watering restrictions have been the key to the overall reduction in water use, and have also successfully reduced maximum day demands.

### **Education**

Public education is essential to any conservation program, and RWSD provides conservation education to customers through multiple sources including newsletters, the District's web site, seminars, and demonstration projects. RWSD's educated customer base contributes significantly to the low per capita water use in the District.

### **Conservation Pricing**

A conservation based rate structure provides financial incentives conservation. RWSD's increasing block rate structure provides significant conservation incentives, particularly to customers in the highest water use brackets.

### **Customer Consumption Monitoring**

RWSD monitors customer consumption, and personally contacts customers with unusually high consumption. Personal contact provides the opportunity to assist customers in reducing

consumption, as well as raising customer awareness of normal consumption.

### **Conservation Rebates**

RWSD provides conservation rebates for installation of high efficiency appliances. In 2008 and 2009, the District provided approximately \$24,000 in rebates to almost 200 customers. Besides improving water efficiency, the popularity of the rebate program demonstrates the community's interest in water conservation.

### **Colorado State Parks**

Chatfield State Park obtains potable water from Denver Water and acts as a water distributor in providing for the needs of park facilities, grounds, and over 1.7 million annual park visitors on properties managed by the park through a lease with the U.S. Army Corps of Engineers, which owns the property. The majority of the water delivery infrastructure and end use appliances was originally designed and built by the USACE in the late 1970's.

In order to maximize water conservation, Chatfield State Park utilizes the following practices:

- All new or replacement facilities and appliances meet water conservation, low flush, and low flow standards.
- Use of pay showers and washing machines in campground visitor service centers.
- Vehicle washing and Aquatic Nuisance Species decontamination equipment meet low flow criteria.
- Nighttime sprinkler watering of the only park turf grass area at the swim beach is accomplished according to the recommended Denver Water schedule.
- Drip lines are used only until new shrubs and trees are established.
- Ongoing efforts to remove Russian olive and tamarisk.
- Use of native vegetation whenever possible for revegetation efforts.
- Continuous monitoring of invoices and meters for evidence of leaks.

### **Stonegate Village Metropolitan District**

Stonegate Village Metropolitan District ("SVMD") provides water and wastewater services to residents and businesses located in Douglas County. In addition to the residents of the SVMD, SVMD provides these same services, by contract, to residents and businesses in the adjacent Lincoln Park Metropolitan District and Compark Business Campus Metropolitan District. At build-out, SVMD will serve approximately 4700 single family equivalents (SFE).

SVMD has taken three steps to promote water conservation to its customers. First, it has established the following outdoor watering schedule:

- No outdoor watering before April 15<sup>th</sup> or after October 15<sup>th</sup>
- Addresses ending with an even number (0, 2, 4, 6 or 8) may water Sunday, Tuesday and Friday.
- Addresses ending with an odd number (1,3,5,7 or 9) may water Monday, Thursday and Saturday.
- No watering is permissible on Wednesday
- Watering is permissible between the hours of 7 pm and 8 am on your designated watering days.
- Three week grace period with no watering restrictions is granted for users with new lawns provided the installation occurs prior the Memorial Day or after Labor Day.

Second, established an increasing fee structure based on water use as follows:

- \$1.61 per 1,000 gallons for the first 6,000 gallons
- \$2.95 per 1,000 gallons for the next 6,000 gallons
- \$4.29 per 1,000 gallons for the next 6,000 gallons
- \$5.36 per 1,000 gallons for the next 6,000 gallons
- \$7.50 per 1,000 gallons for the next 6,000 gallons

Thirdly, SVMD utilizes treated effluent from its wastewater treatment plant to irrigate approximately 150 acres of parks and open space.

In addition to the above, SVMD is currently working on a rebate programs that encourage removal of Kentucky Bluegrass, installation of ET Controllers, installation of approved rotary nozzles and purchase of High Efficiency Clothes Washers.

Finally, the SVMD is a member of the Douglas County Water Resource Authority which, among others, is dedicated to water resource conservation and education.

### **Western Mutual Ditch Company**

Western Mutual Ditch Company is an agricultural organization that coordinates very closely with the Central Colorado Water Conservancy District in the operation of its water conservation program. This coordination includes active participation in the Colorado Agricultural Conservation Outreach program. This program supplies ultra-efficient irrigation equipment to farmers, and provides outreach seminars and in-field conservation services to the Colorado public.

In addition, all agricultural production wells used by members of the Western Mutual Ditch Company are metered and flow amounts are carefully recorded and reported to appropriate officials.

### **Douglas County Water Resources Authority**

Douglas County Water Resources Authority (DCWRA) is not a participant in the Chatfield Reallocation project but, instead, is a regional collection of 19 governments, created in 1992, dedicated to water resource conservation, education and policy formation. All nine of the participants in the Chatfield project located in Douglas County are members of DCWRA and contribute financially to its water conservation activities. These innovative activities have included:

- Distribution of 108,000 newly created DVDs on Xeriscape principles to all single family residents in Douglas County.
- Educational and training programs targeted to elementary and middle school teachers.
- Member surveys on water conservation programs to facilitate information sharing.
- Promotion of county, state and federal legislation promoting water conservation.
- Creative conservation awareness programs with corporate partners.
- Training 160 high school students as Water Ambassadors who then trained another 2,000 fourth grade students in water conservation principles.
- Advertisements during Colorado Rockies broadcasts reaching 16 million persons
- Creation of conservation tip videos (available for viewing at the Authorities website: [DCWater.org](http://DCWater.org)).

- Promotion of the EPA WaterSense program.